

# Remote Underwater Imaging

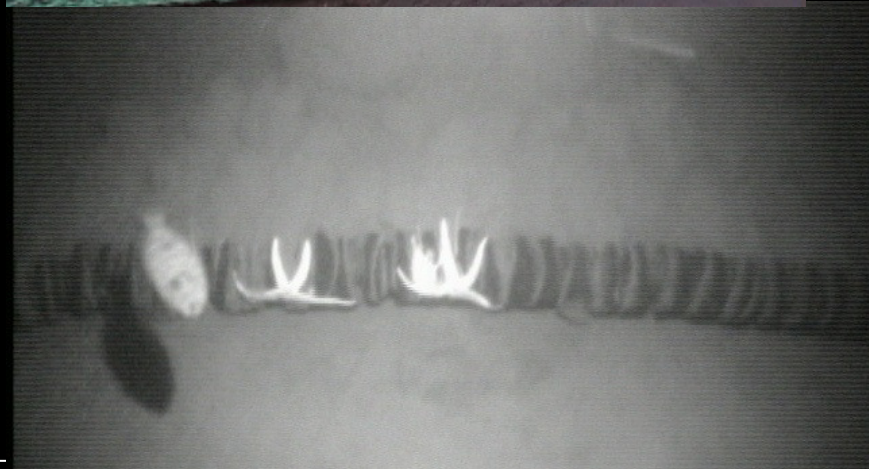
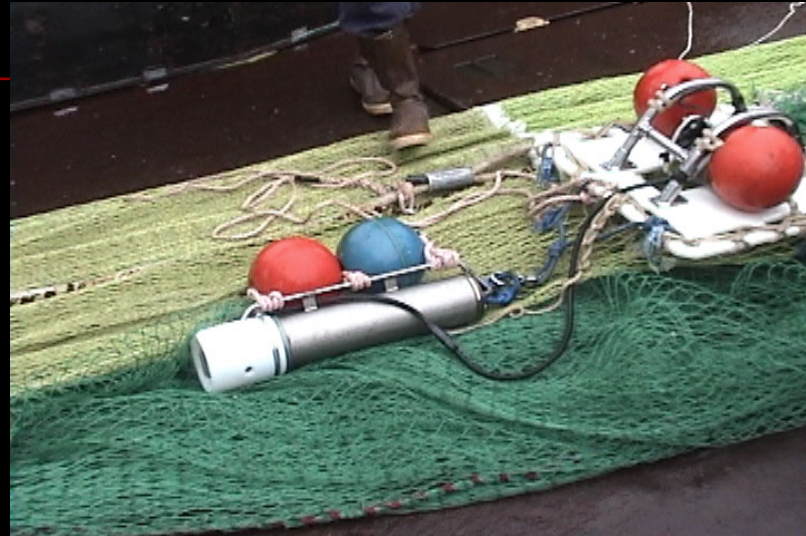
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- Trawl Video
  - Low light, color and intensified IR
- Drop cameras
- Towed cameras
  - Video synched with strobe
- Sonar Imaging
  - Didson and Imagenix
- Deck video
- Stereo



# Imaging system components

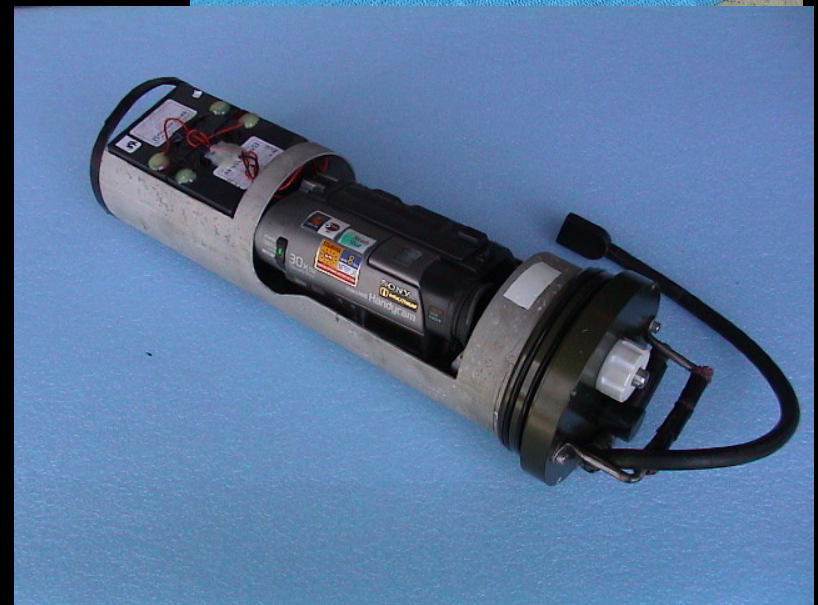
- Pressure housing
- Connectors
- Lights
- Cameras
- Mounting frames
- Batteries
- Control
- Recording



# Pressure Housings

## ■ Material

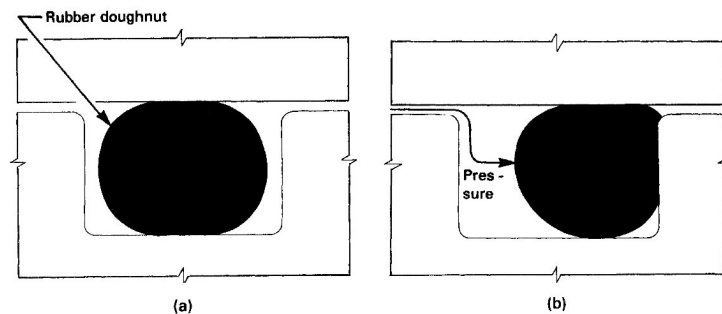
- Aluminum
- Stainless Steel
- Titanium



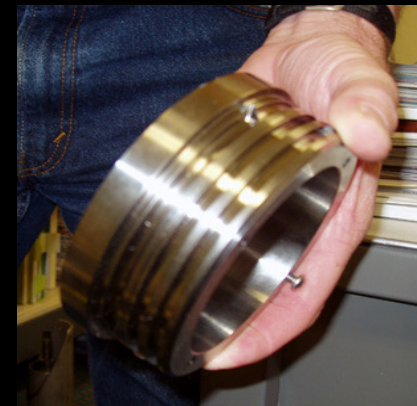


# Pressure housing Seals

- Piston
- face



**Figure 1.1** How an O ring works. (a) As installed. (b) Under pressure. (From The Parker O-Ring Handbook, courtesy of Parker Seal Group.)





# Pressure housing closure

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Clamps

Screws

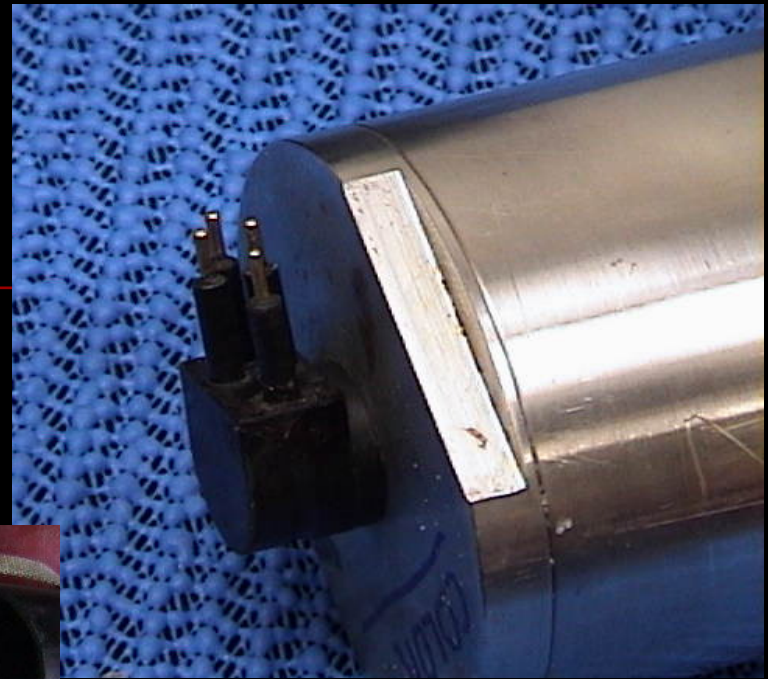
Keeper rods



# Connectors

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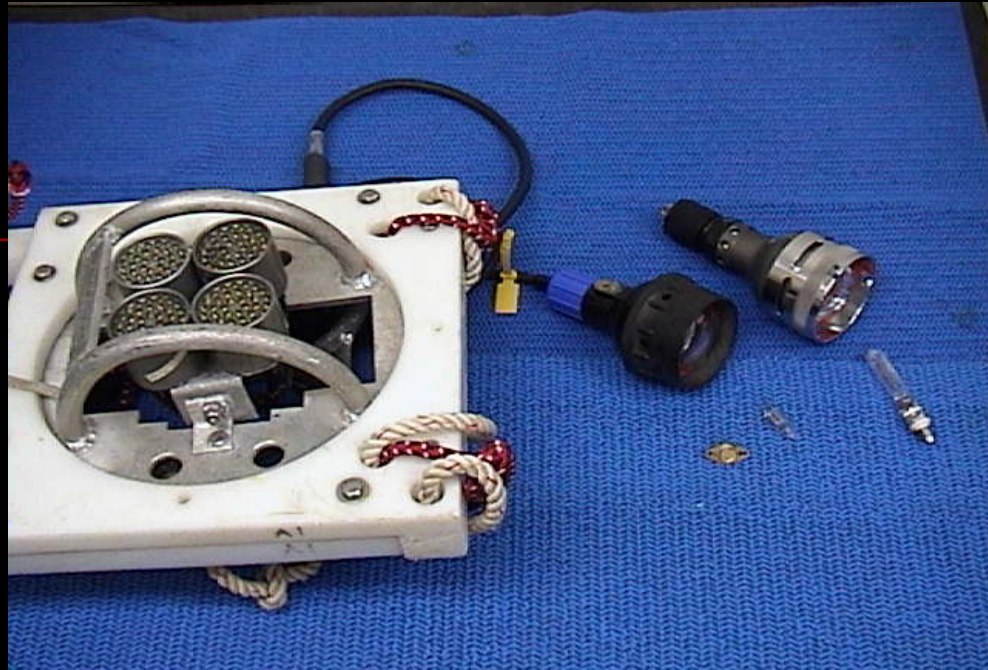
- Wet pluggable
- Metal shell



# Lights

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- LED
- Halogen
- HID





# Lights

HID

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Zenon strobe

LED





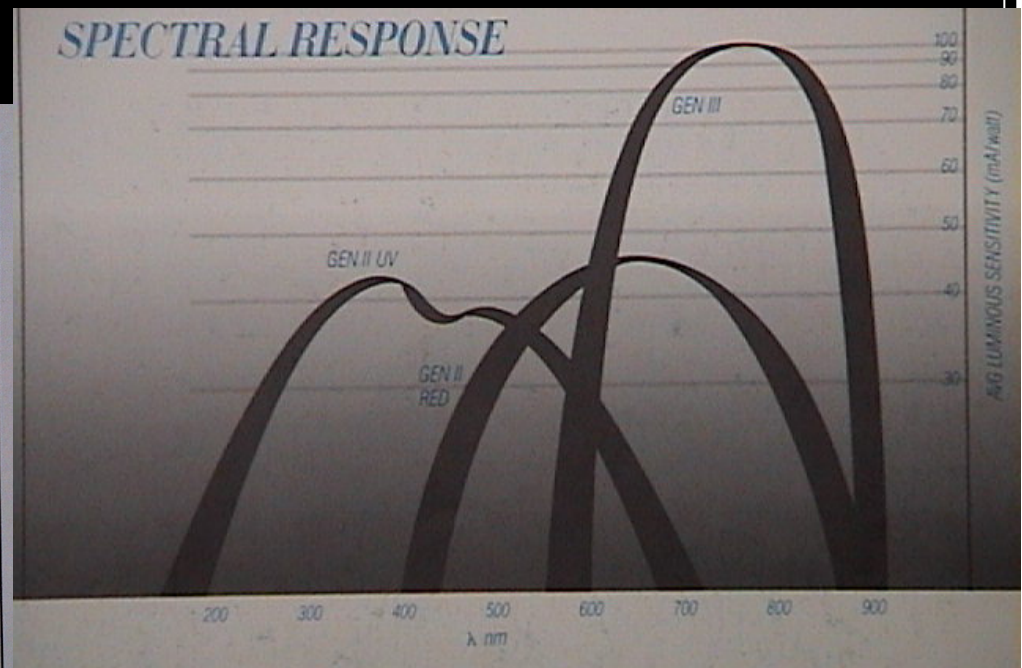
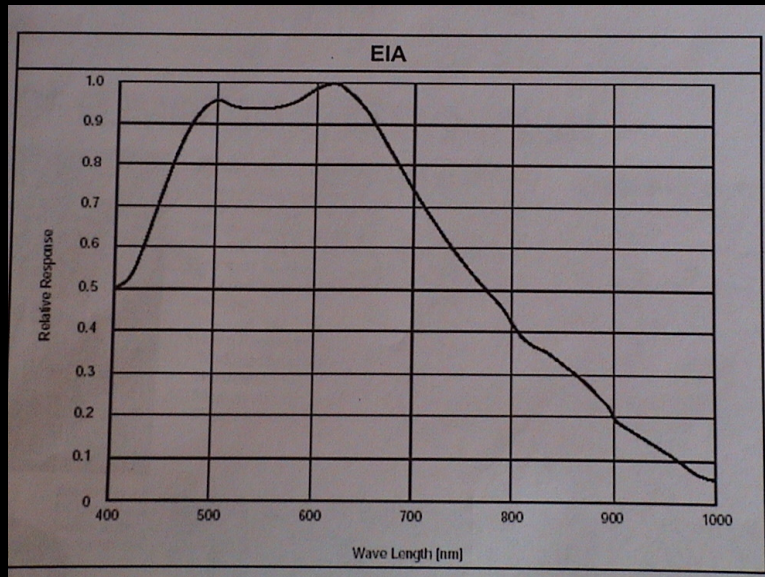
# Cameras

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- CCD
  - Color
  - Black and white
  - intensified
- Camcorders
  - HD
- Machine Vision
- IP



# Typical Spectral Sensitivity of CCD





# Mounting frames

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## ■ Cages

- Aluminum
- Plastic
- Stainless
  - Tubing
  - Solid rod hardened

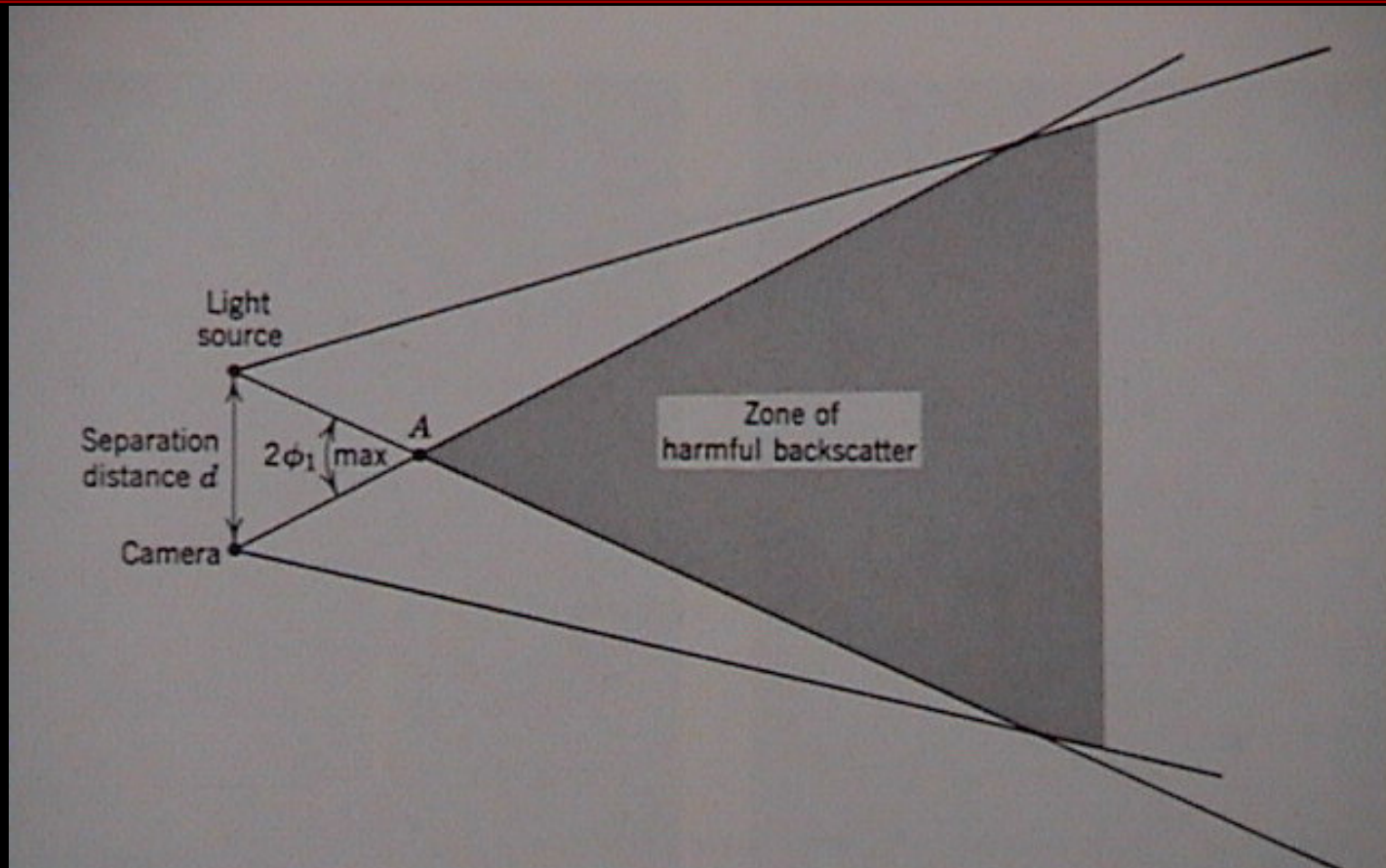


## ■ Neutrally buoyant

- Trawl float – eyeball
- TACOS

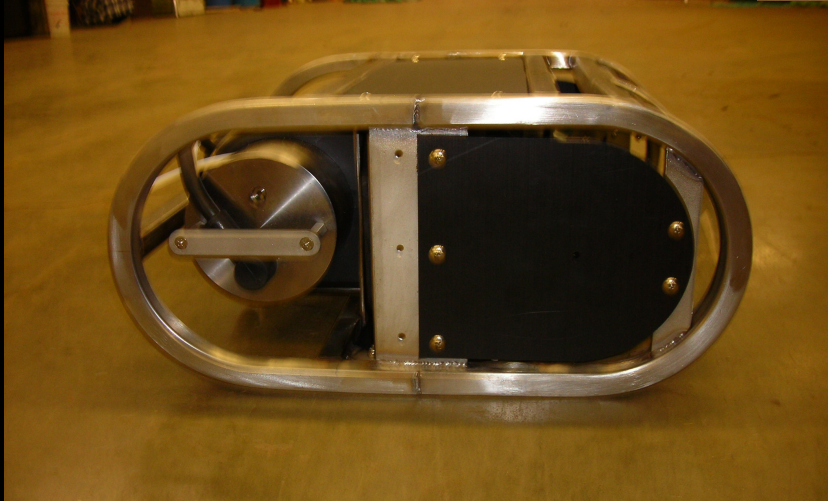
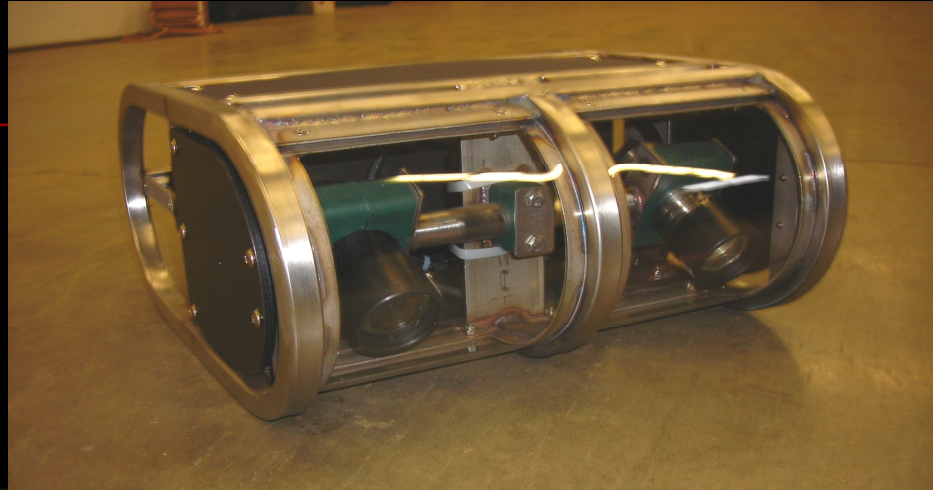


# Backscatter Considerations



# Mounting frames

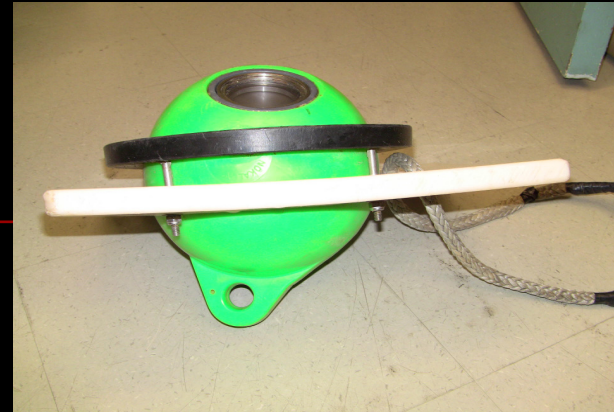
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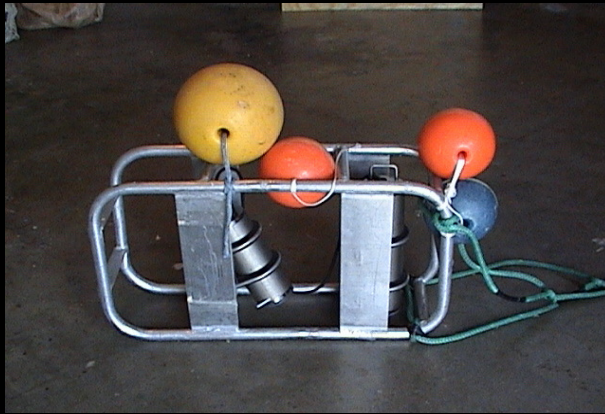


# Mounting frames

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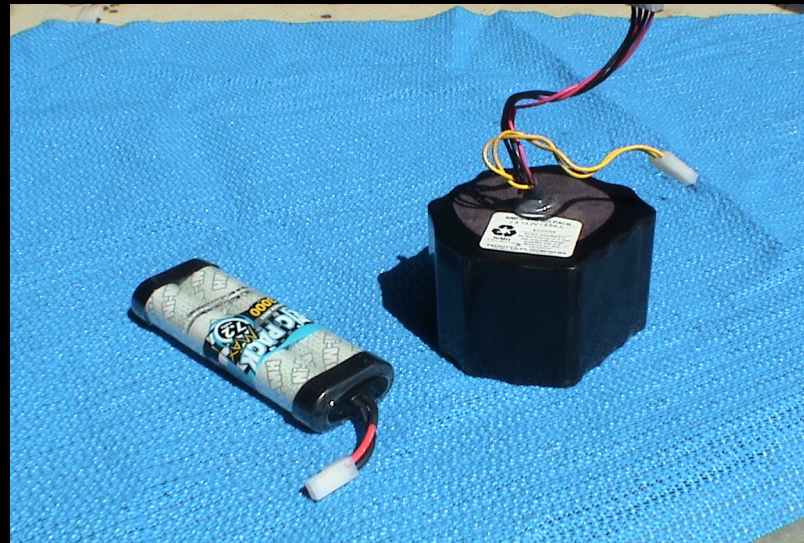
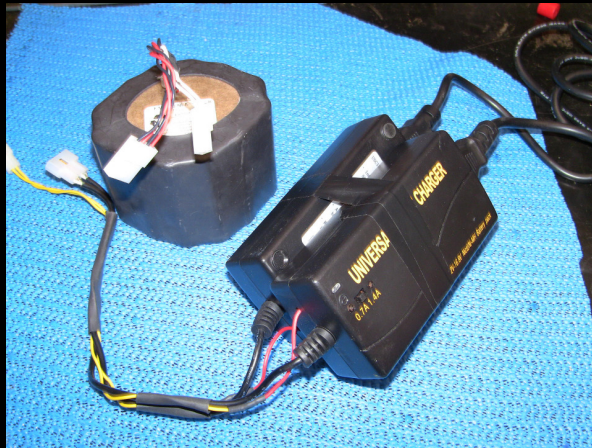
# Drop Cameras, Sleds





# Batteries

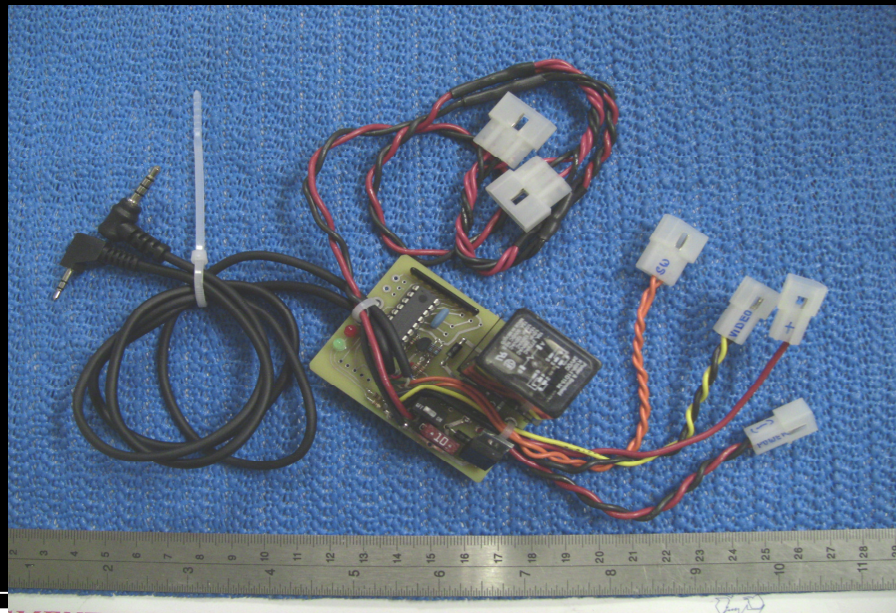
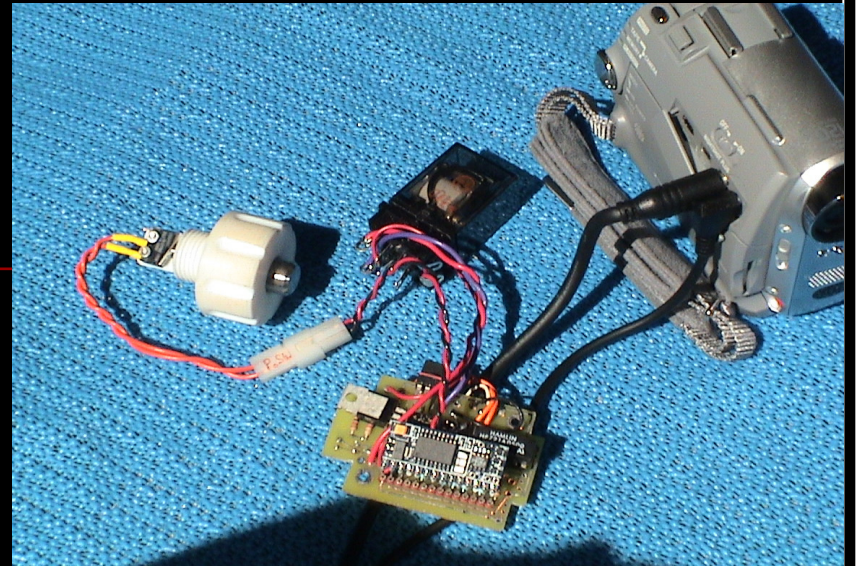
- Lead acid
- NiMh
- Lithium
  - Battery Charging





# Control

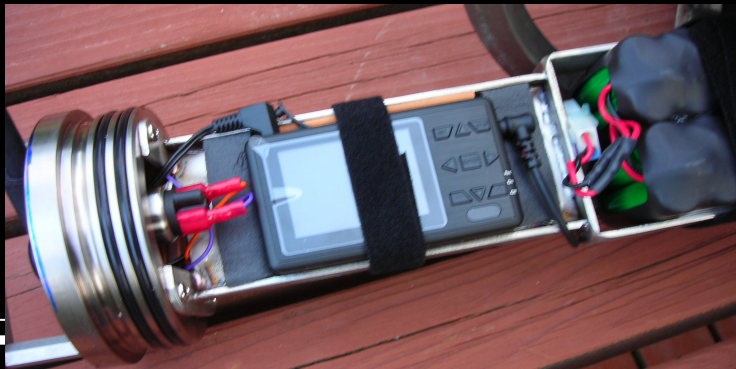
- Pressure switches
- Linc
- Motion detect





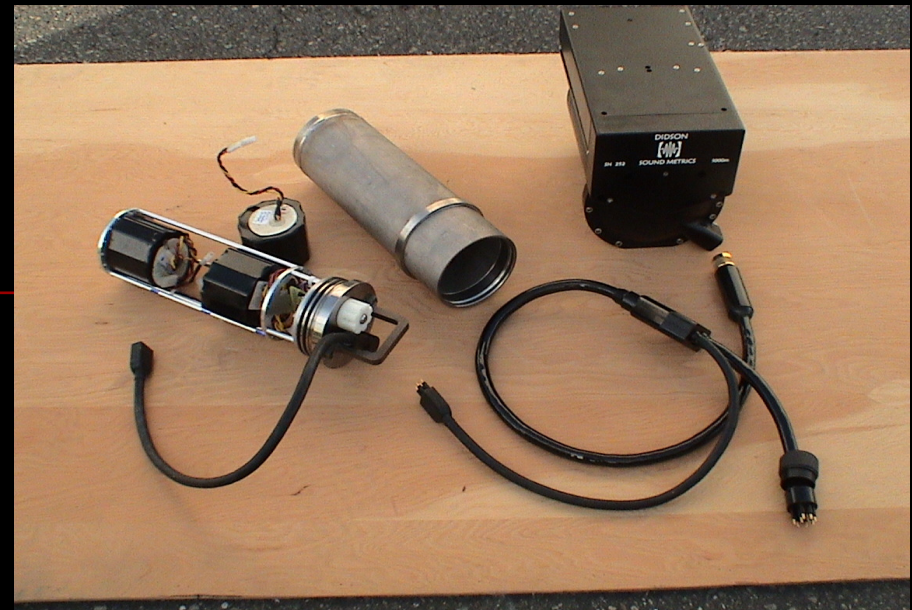
# Recorders

- Mini security DVR
  - Compression
    - MPEG
    - AVHC
- Camcorder
- PC based



# Remote Sonar

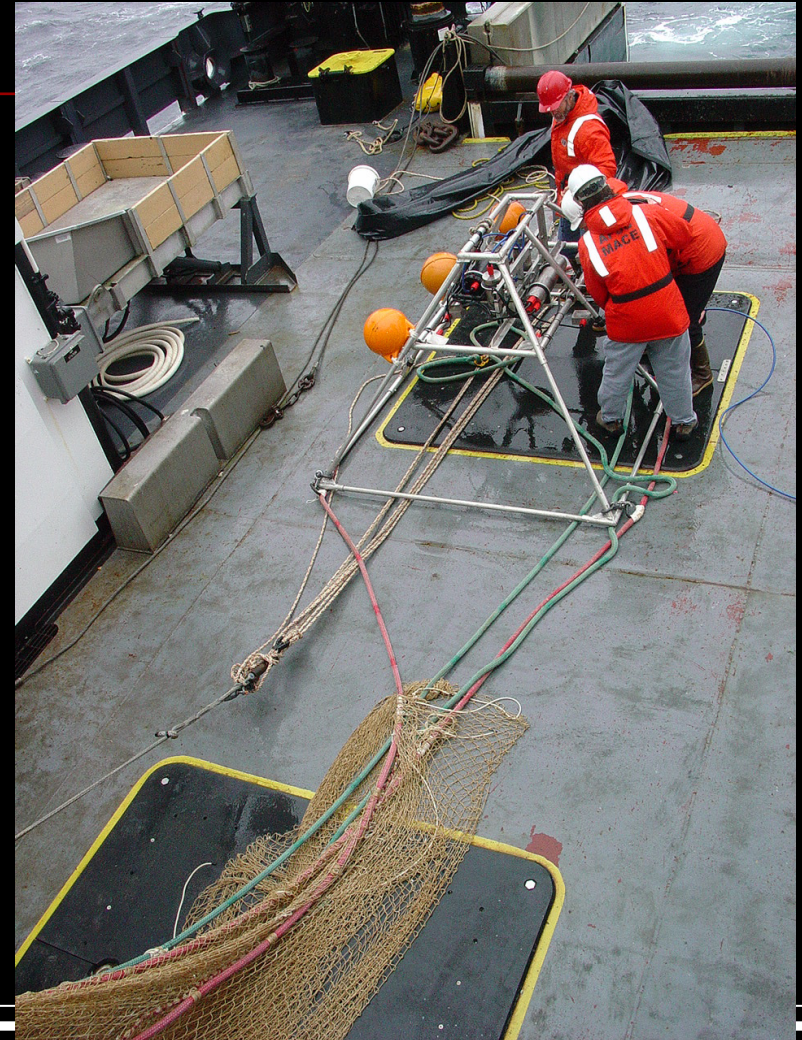
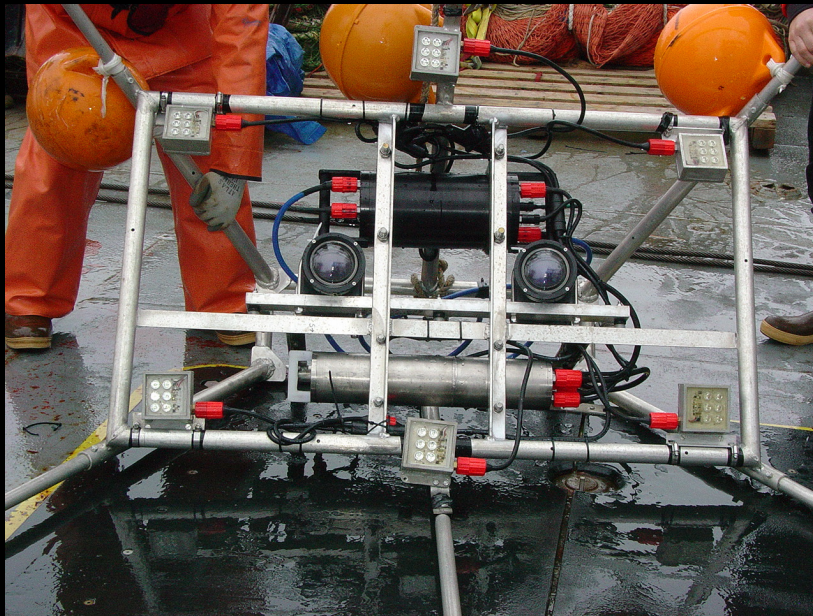
- Small PC control
- Didson
- Sector scanning





# Stereo Image capture

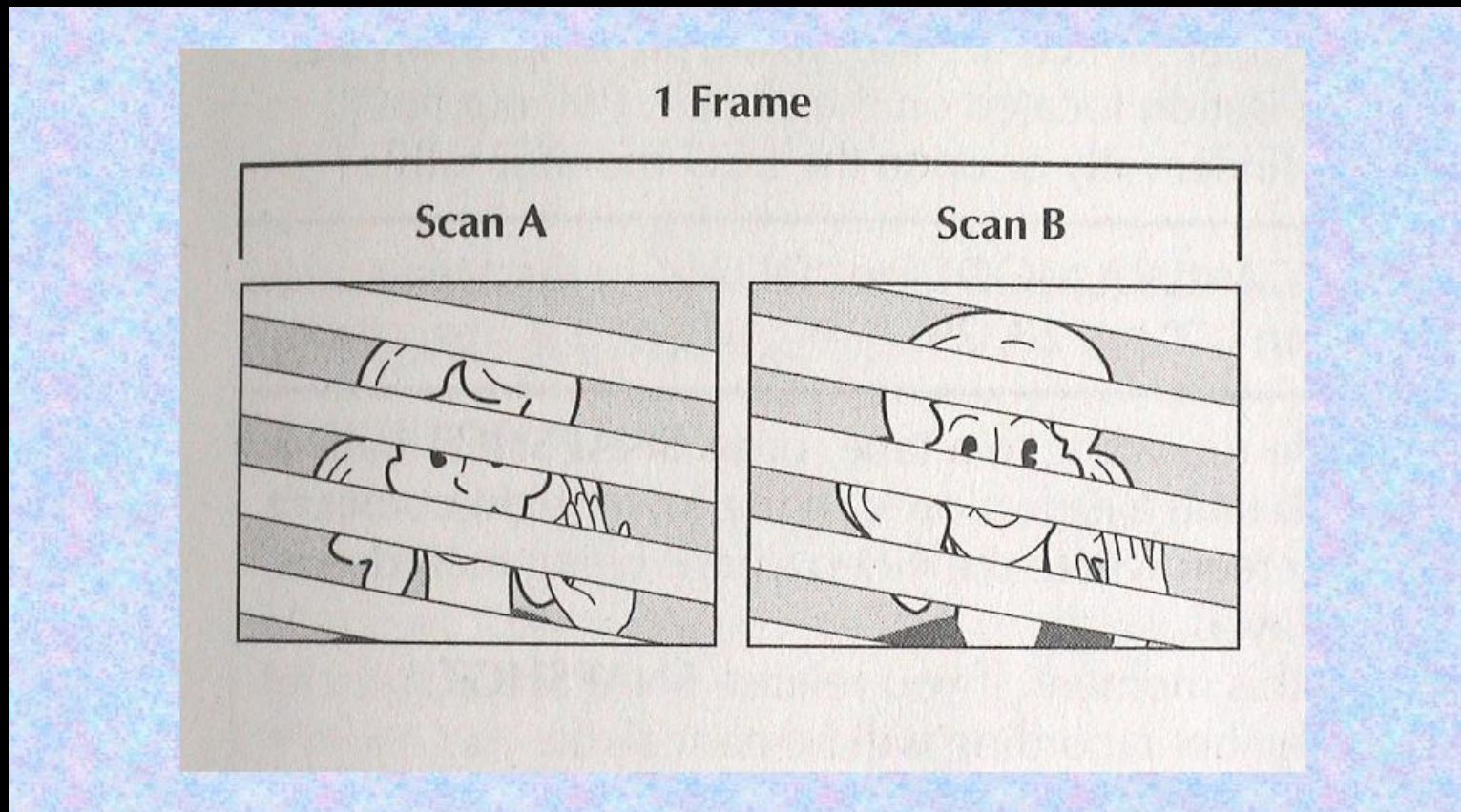
- Machine vision
- Progressive scan





# Progressive scan vs Interlace scan

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High resolution (4 Mp) stereo-images of Pacific hake collected at 6 fps  
using machine vision camera

